



Balanced Fertilisation

For Prelims: [Nutrient-Based Subsidy \(NBS\) schemes](#), [urea consumption](#), [Fertiliser Subsidy](#)

For Mains: About the balanced fertilisation and its associated benefits, Challenges and government initiatives related to the balanced fertilisation.

Source: [IE](#)

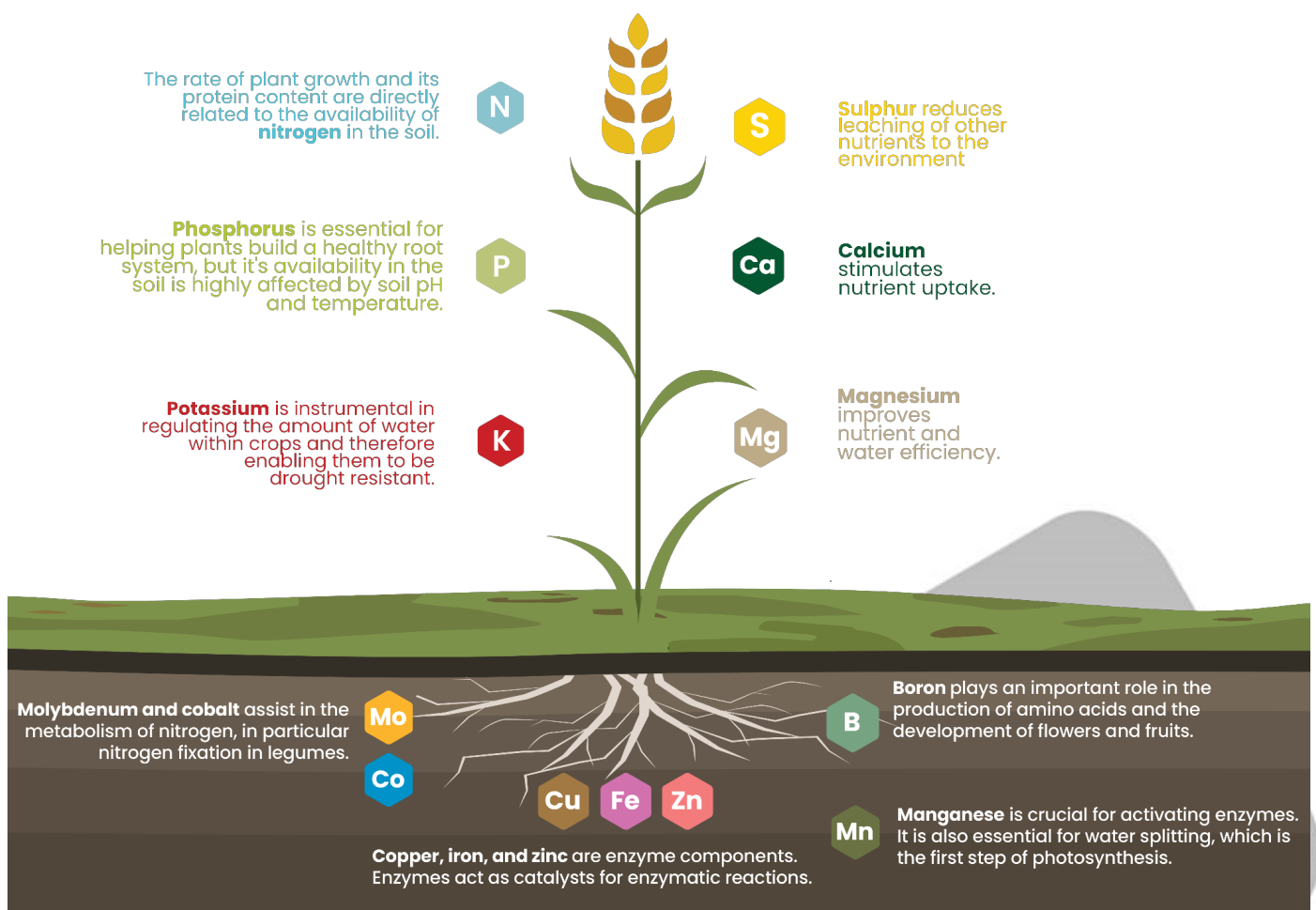
Why in News?

Post Lok Sabha elections 2024, balanced fertilisation is likely to be a key policy goal for the government taking over.

- Despite efforts to curb excessive fertiliser consumption, [urea consumption](#) has steadily increased in India, reaching a **record 35.8 million tonnes in 2023-24** (up 16.9% since 2013-14).

What is Balanced Fertilization?

- **About:**
 - **Balanced fertilisation** is a practice in agriculture that focuses on providing plants with the **optimal amounts of the nutrients** that are needed for their healthy growth and development.
- **Essential Nutrients:**
 - **Primary Nutrients:** [Nitrogen \(N\)](#), [Phosphorus \(P\)](#), and [Potassium \(K\)](#) are the most crucial nutrients needed in larger quantities. They play **vital roles in plant** structure, energy production, and overall health.
 - **Secondary Nutrients:** Sulphur (S), Calcium (Ca), and Magnesium (Mg) are also essential but **required in smaller amounts** compared to primary nutrients.
 - **Micronutrients:** Trace elements like Iron (Fe), Zinc (Zn), Copper (Cu), Manganese (Mn), Boron (B), and Molybdenum (Mo) are needed in very small quantities but are still critical for specific plant functions.
- **Right Proportion:**
 - Balanced fertilisation emphasises supplying these essential nutrients in the correct ratios based on several factors:
 - **Soil Type:** Different soil types have varying levels of inherent nutrients. Testing the soil reveals its [nutrient profile](#), **guiding fertiliser selection and application rates**.
 - **Crop Requirements:** Different crops have **specific nutrient needs at different stages of growth**. For example, legumes might require more nitrogen for nitrogen fixation, while fruits might benefit from additional potassium for better quality.



What are the Benefits Associated with Balanced Fertilisation?

- **Improved Crop Yields:**
 - By providing the **optimal mix of nutrients**, plants can grow to their full potential, leading to higher yields.
- **Enhanced Crop Quality:**
 - Balanced nutrients contribute to stronger plants with **better resistance to pests and diseases**, ultimately improving the quality of the harvest.
- **Promotes Soil Health:**
 - Overuse of **single-nutrient fertilisers** can disrupt soil health. Balanced fertilisation helps maintain a **healthy soil ecosystem**, promoting long-term sustainability.
- **Reduced Environmental Impact:**
 - Excessive fertiliser application can contribute to **nutrient runoff, polluting water bodies**. Balanced use minimises this risk.
- **Cost-Effectiveness:**
 - By **preventing over-fertilisation** and nutrient deficiencies, balanced fertilisation can optimise resource utilisation and reduce overall fertiliser costs.

What are the Challenges related to Balanced Fertilisation?

- **Price Distortions:**
 - **Urea**, a single-nutrient nitrogen fertiliser, is heavily subsidised by the government, making it **cheaper than other fertilisers like DAP** (diammonium phosphate) containing phosphorus and MOP (muriate of potash) containing potassium.
 - This incentivises overuse of urea and neglects other crucial nutrients.
- **Distorted Fertiliser Pricing Hinders Potash Use:**
 - The current system for setting **fertiliser prices** fails to consider market forces, leading to imbalances. For example, the price of Muriate of Potash (MOP), a key source of

potassium, is **too high for both** farmers using it directly and fertiliser companies including it in blends.

- This **discourages MOP use**, contributing to widespread potassium deficiencies in Indian farms.

▪ **Soil Testing Infrastructure:**

- **Lack of adequate soil testing facilities** in the rural and remote areas of India, makes it difficult for farmers to access them for balanced fertilisation.
- Even if tests are done, **interpreting the results and translating them** into fertiliser recommendations requires proper training and mechanism for both farmers and extension workers.

▪ **Farmer Awareness and Education:**

- Many farmers lack awareness about soil testing and the specific needs of their crops.
- Traditional practices and limited knowledge mostly hinders adoption of balanced **fertilisation techniques**.
 - It is due to the lack of precise fertiliser application techniques resulting in issues of over-fertilisation and under-fertilisation alongwith **limited focus on micronutrients**.

▪ **Limited Success of Past Schemes:**

- The **Nutrient-Based Subsidy (NBS) scheme**, meant to encourage balanced use, failed because it didn't address urea pricing. Urea consumption continued to rise despite NBS.



Nutrient Based Subsidy Scheme

About:

- A fixed rate of subsidy (in ₹ per Kg) decided on an annual basis
- Being implemented since 2010

Implemented by:

- Department of Fertilisers, Ministry of Chemicals & Fertilizers

Ambit of NBS:

- Given on nutrients - Nitrogen, Phosphate, Potash and Sulphur
- For Phosphatic and Potassic (P&K) fertilisers
- Doesn't include Urea based fertilisers
- NBS is available for imported complex fertilisers except Ammonium Sulphate

Aim:

- Ensure the availability of fertilisers to farmers at an affordable price
- Increase consumption of P&K fertilizers to achieve optimum NPK ratio (4:2:1)

Fertilisers in India:

- 3 basic fertilisers – Urea, Diammonium Phosphate (DAP), and Muriate of Potash (MOP)
- Urea is the most – produced, consumed, imported and physically regulated fertiliser of all
- Urea is subsidised only for agricultural uses

Nutrient	Main Source
Nitrogen (N)	Urea
Phosphorus (P)	DAP
Potassium (K)	MOP



What are the Government Initiatives to Ensure Balanced Fertilization?

- [Nutrient-Based Subsidy \(NBS\) Scheme](#)
- [PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth \(PRANAM\)](#)
- [Soil Health Card \(SHC\) Scheme](#)
- [Paramparagat Krishi Vikas Yojana \(PKVY\)](#)
- [Liquid Nano Urea](#) and [Nano DAP](#)

What Steps Can be Taken by India to Achieve Balanced Fertilisation?

- **Integrated Nutrient Management (INM):**
 - It recognises the limitations of relying solely on chemical fertilisers or organic matter.
 - It advocates for a holistic approach that combines:
 - **Chemical Fertilisers:** Provide **essential nutrients** like NPK.
 - **Organic Matter:** Improves **soil health, water retention**, and nutrient availability. This **includes manure (cow dung), compost, and crop residues (dhaincha crop)**.
 - **Crop Rotations:** Introducing diverse crops helps **break pest and disease cycles** and improves nutrient utilisation.
- **Customising Fertilisers Using Technology:**
 - Customised fertilisers are **multi-nutrient carriers** containing **macro and micronutrients** for satisfying crop needs that are **site-specific and validated by scientific crop models**.
 - It is the **emerging concept** based on the **balanced nutrient fertilisation approach** to address the crops' multiple nutrient needs.
 - **In Israel**, some remarkable steps are being followed:
 - **High-resolution soil mapping** and its integration with [Geographic Information Systems \(GIS\)](#) to create user-friendly maps and fertiliser application recommendations for farmers.
 - **Advanced laboratory analyses** go beyond basic NPK tests and delve into micronutrients, organic matter content, and cation exchange capacity (CEC).
- **Advanced Approaches Beyond Soil Testing:**
 - **Soil Test Crop Response (STCR):**
 - Tailors **fertiliser recommendations** based on specific soil type, crop variety, and climatic conditions.
 - It considers nutrient uptake by the crop and soil nutrient availability.
 - **Diagnosis and Recommendation Integration System (DRIS):**
 - **Analyses plant tissue** for nutrient ratios (e.g., N/P, N/K) and compares them to established optimal ratios for high yields.
 - **Deficient nutrients** are then supplemented through top dressing. (More suitable for long-duration crops).
- **Other Steps:**
 - **Farmer Education and Training:** Equipping farmers with the knowledge and skills to implement these approaches effectively.
 - **Improved Market Access:** Ensuring the availability of customised fertilisers and micronutrients at reasonable prices.
 - **Policy and Subsidy Reforms:** Encouraging the use of balanced fertilisers through targeted subsidies and promoting sustainable practices.
 - **Continued Research and Development:** Developing new technologies and crop-specific nutrient management solutions.

Conclusion

- Balanced fertilisation offers a compelling solution to numerous challenges in Indian agriculture. **Sri Lanka's recent attempt at a rapid transition towards fully organic agriculture** serves as a

cautionary tale for Indian policymakers considering similar drastic shifts.

- By providing the right mix of nutrients to crops, it promises not only increased yields and improved quality but also enhanced soil health and reduced environmental impact.
- However, achieving balanced fertilisation on a large scale necessitates overcoming obstacles like skewed fertiliser pricing policies, limited soil testing infrastructure, and a knowledge gap among farmers.

Drishti Mains Question:

Q. Discuss about balanced fertilisation and its associated benefits. Also, mention the key challenges and government initiatives related to it.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. With reference to chemical fertilizers in India, consider the following statements: (2020)

1. At present, the retail price of chemical fertilizers is market-driven and not administered by the Government.
2. Ammonia, which is an input of urea, is produced from natural gas.
3. Sulphur, which is a raw material for phosphoric acid fertilizer, is a by-product of oil refineries.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 and 3 only
(c) 2 only
(d) 1, 2 and 3

Ans: (b)

Q. With reference to the cultivation of Kharif crops in India in the last five years, consider the following statements: (2019)

1. Area under rice cultivation is the highest.
2. Area under the cultivation of jowar is more than that of oilseeds.
3. Area of cotton cultivation is more than that of sugarcane.
4. Area under sugarcane cultivation has steadily decreased.

Which of the statements given above are correct?

- (a) 1 and 3 only
(b) 2, 3 and 4 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

Ans: (a)

Mains:

Q1. How do subsidies affect the cropping pattern, crop diversity and the economy of farmers? What is the significance of crop insurance, minimum support price and food processing for small and marginal farmers? **(2017)**

Q2. In what way could replacement of price subsidy with direct benefit Transfer (DBT) change the scenario of subsidies in India? Discuss. **(2015)**

Q3. What are the different types of agriculture subsidies given to farmers at the national and at state levels? Critically, analyse the agricultural subsidy regime with reference to the distortions created by it. **(2013)**

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